**CLAIMS**

What is claimed is:

1. A resistance module configured for an exercise machine for providing a substantially constant force through a range of motion, comprising:

at least one cantilever spring and at least one rigid member movable with respect to one another along a path of travel with the at least one rigid member causing the at least one cantilever spring to deflect and produce a resistance force as the at least one cantilever spring and the at least one rigid member move with respect to one another along the path of travel;

the cantilever spring having an anchored end and a deflection end;

the at least one rigid member engaging the deflection end of the cantilever spring, and constraining the deflection end to a predetermined path of deflection as the at least one cantilever spring and the at least one rigid member move with respect to one another; and

means for operatively coupling at least one of the cantilever spring and the at least one rigid member to an exercise machine.

2. A module in accordance with claim 1, wherein the at least one rigid member separates the resistance force produced by the at least one cantilever spring into i) a first component that is substantially constant through the path of deflection, and ii) a second component that is substantially non-constant through the path of deflection; and wherein the means for operatively coupling operatively couples only the first component of the resistance force produced by the at least one cantilever spring to the exercise machine.

3. A module in accordance with claim 1, wherein the path of travel is substantially linear.

4. A module in accordance with claim 1, wherein:

the rigid member includes at least one non-planar contact surface;

the deflection end of the cantilever spring is engagable with, and tracks along, the non-planar contact surface as the cantilever spring and the non-planar contact surface move with respect to one other along the path of travel; and

the cantilever spring is bendable as the deflection end tracks along the non-planar contact surface to produce the substantially constant resistance force in a direction of the path of travel as the cantilever spring and the non-planar contact surface move with respect to one other along the path of travel.

5. A module in accordance with claim 4, further comprising a pair of opposing resistance modules disposed in an opposite orientation with respect to each other, including a pair of opposite cantilever springs and a pair of opposing non-planar contact surfaces.

6. A module in accordance with claim 5, wherein a first cantilever spring is coupled to a first non-planar contact surface and opposes a second cantilever spring coupled to a second non-planar contact surface, with a deflection end of the first cantilever spring engagable with the second non-planar contact surface and a deflection end of the second cantilever spring engagable with the first non-planar contact surface.

7. A module in accordance with claim 4, further comprising:

two pairs of resistance modules disposed in opposing orientation with respect to each other and being oriented in a first layer; and

a second two pairs of resistance modules disposed in opposing orientation with respect to each other and being oriented in a second layer parallel and adjacent to the first layer.

8. A module in accordance with claim 7, wherein the second two pairs of resistance modules are disposed behind the two pairs of resistance modules.

9. A module in accordance with claim 4, wherein the cantilever spring applies a force to the non-planar contact surface that varies in angle with respect to the linear path of travel as the deflection end of the spring tracks along the non-planar contact surface.

10. A module in accordance with claim 4, further comprising a slidable bearing disposed on the deflection end of the cantilever spring.

11. A module in accordance with claim 4, further comprising a rolling bearing coupled to the deflection end of the cantilever spring.

12. A module in accordance with claim 4, wherein the non-planar contact surface includes an arcuate surface.

13. A module in accordance with claim 4, wherein the non-planar contact surface includes a circular surface having a substantially constant radius of curvature through at least 45 degrees.

14. A module in accordance with claim 1, wherein:

the rigid member includes at least one pivot link having a moving end and a pivot end;

the deflection end of the cantilever spring is pivotally coupled to the moving end of the pivot link; and

the cantilever spring being bendable and the pivot link being pivotal as the cantilever spring and the pivot link move with respect to one other along the path of travel.

15. A resistance module configured for an exercise machine for providing a substantially constant force through a range of motion, comprising:

at least one cantilever spring and at least one rigid member, each being operatively restrained by at least one guide rail along a substantially linear path of travel with respect to one another;

the at least one rigid member causing the at least one cantilever spring to deflect and produce a resistance force as the at least one cantilever spring and the at least one rigid member move with respect to one another along the linear path of travel;

the cantilever spring having an anchored end and a deflection end; and

the at least one rigid member engaging the deflection end of the cantilever spring, and constraining the deflection end to a predetermined path of deflection as the at least one cantilever spring and the at least one rigid member move with respect to one another.

16. A module in accordance with claim 15, further comprising:

means for operatively coupling at least one of the cantilever spring and the at least one rigid member to an exercise machine.

17. A module in accordance with claim 16, wherein the at least one rigid member separates the resistance force produced by the at least one cantilever spring into i) a first component that is substantially constant through the path of deflection, and ii) a second component that is substantially non-constant through the path of deflection; and wherein the means for operatively coupling operatively couples only the first component of the resistance force produced by the at least one cantilever spring to the exercise machine

18. A module in accordance with claim 15, wherein:

the rigid member includes at least one non-planar contact surface;

the deflection end of the cantilever spring is engagable with, and tracks along, the non-planar contact surface as the cantilever spring and the non-planar contact surface move with respect to one other along the path of travel; and

the cantilever spring is bendable as the deflection end tracks along the non-planar contact surface to produce the substantially constant resistance force in a direction of the path of travel as the cantilever spring and the non-planar contact surface move with respect to one other along the path of travel.

19. A module in accordance with claim 18, further comprising a pair of opposing resistance modules disposed in an opposite orientation with respect to each other, including a pair of opposite cantilever springs and a pair of opposing non-planar contact surfaces.

20. A module in accordance with claim 19, wherein a first cantilever spring is coupled to a first non-planar contact surface and opposes a second cantilever spring coupled to a second non-planar contact surface, with a deflection end of the first cantilever spring engagable with the second non-planar contact surface and a deflection end of the second cantilever spring engagable with the first non-planar contact surface.

21. A module in accordance with claim 18, further comprising:

two pairs of resistance modules disposed in opposing orientation with respect to each other and being oriented in a first layer; and

a second two pairs of resistance modules disposed in opposing orientation with respect to each other and being oriented in a second layer parallel and adjacent to the first layer.

22. A module in accordance with claim 21, wherein the second two pairs of resistance modules are disposed behind the two pairs of resistance modules.

23. A module in accordance with claim 18, wherein the cantilever spring applies a force to the non-planar contact surface that varies in angle with respect to the linear path of travel as the deflection end of the spring tracks along the non-planar contact surface.

24. A module in accordance with claim 18, further comprising a slidable bearing disposed on the deflection end of the cantilever spring.

25. A module in accordance with claim 18, further comprising a rolling bearing coupled to the deflection end of the cantilever spring.

26. A module in accordance with claim 18, wherein the non-planar contact surface includes an arcuate surface.

27. A module in accordance with claim 18, wherein the non-planar contact surface includes a circular surface having a substantially constant radius of curvature through at least 45 degrees.

28. A module in accordance with claim 15, wherein:

the rigid member includes at least one pivot link having a moving end and a pivot end;

the deflection end of the cantilever spring is pivotally coupled to the moving end of the pivot link; and

the cantilever spring is bendable and the pivot link is pivotal as the cantilever spring and the pivot link move with respect to one other along the path of travel.

29. A resistance module configured for an exercise machine for providing a substantially constant force through a range of motion, comprising:

a pair of opposing crossheads moveable with respect to each other along a path of travel;

at least one guide rail along which at least one of the pair of opposing crossheads moves along the path of travel;

at least one rigid member, associated with one of the pair of opposing crossheads;

at least one cantilever spring, associated with another of the pair of opposing crossheads and engagable with the at least one rigid member as the pair of opposing crossheads move with respect to one another, the cantilever spring providing a substantially constant compressive resistance force between the crossheads in response to relative movement of the crossheads along the path of travel.

30. A module in accordance with claim 29, further comprising:

means for operatively coupling at least one of the crossheads to an exercise machine.

31. A module in accordance with claim 30, wherein the at least one rigid member separates the resistance force produced by the at least one cantilever spring into i) a first

component that is substantially constant through the path of deflection, and ii) a second component that is substantially non-constant through the path of deflection; and wherein the means for operatively coupling operatively couples only the first component of the resistance force produced by the at least one cantilever spring to the exercise machine

32. A module in accordance with claim 29, wherein:

the rigid member includes at least one non-planar contact surface;

the deflection end of the cantilever spring is engagable with, and tracks along, the non-planar contact surface as the pair of opposing crossheads moves along the path of travel; and

the cantilever spring is bendable as the deflection end tracks along the non-planar contact surface to produce the substantially constant resistance force in a direction of the path of travel as the pair of opposing crossheads moves along the path of travel.

33. A module in accordance with claim 32, wherein the cantilever spring applies a force to the non-planar contact surface that varies in angle with respect to the path of travel as the deflection end of the spring tracks along the non-planar contact surface.

34. A method for providing a substantially constant force through a range of motion for exercising, comprising the steps of:

pulling an active member of an exercise machine through the range of motion;

deflecting a deflection end of at least one cantilever spring through a path of deflection in response to pulling of the active member to produce a resistance force;

separating the resistance force produced by the at least one cantilever spring into i) a first component that is substantially constant through the path of deflection, and ii) a second component that is substantially non-constant through the path of deflection; and

operatively coupling only the first component of the resistance force produced by the at least one cantilever spring to the active member of the exercise machine.

35. A method in accordance with claim 34, further comprising the steps of:

displacing at least one of the cantilever spring and a rigid member relative to each other in a substantially linear path of travel in response to pulling of the active member; and

changing an angle of a force applied to the rigid member by a deflection end of the cantilever spring from a direction substantially parallel with the linear path of travel to a direction at an acute angle to the linear path of travel.

36. A method in accordance with claim 34, wherein the step of displacing at least one of the cantilever spring and the rigid member relative to each other further includes displacing at least one of the cantilever spring and a pivoting link relative to each other in a substantially linear path of travel in response to pulling of the active member.

37. A method in accordance with claim 34, wherein the step of displacing at least one of the cantilever spring and the rigid member relative to each other further includes displacing at least one of the cantilever spring and a non-planar contact surface relative to each other in a substantially linear path of travel in response to pulling of the active member.

38. A method in accordance with claim 37, comprising the further step of displacing at least one of a second cantilever spring and a second non-planar contact surface relative to each other in the substantially linear path of travel.

39. A method in accordance with claim 37, wherein the at least one cantilever spring and non-planar contact surface comprise a resistance module, and comprising the further step of:

disposing two pairs of resistance modules in opposing orientation with respect to each other, and orienting the two pairs in a first plane; and

disposing a second two pairs of resistance modules in opposing orientation with respect to each other, and orienting the second two pairs in a second plane parallel and adjacent to the first plane.

40. A method in accordance with claim 37, comprising the further step of disposing the second two pairs of resistance modules behind the two pairs of resistance modules.

41. A method in accordance with claim 37, wherein the non-planar contact surface includes an arcuate surface.

42. A method in accordance with claim 37, wherein the non-planar contact surface includes a circular surface have a substantially constant radius of curvature through at least 45 degrees.